

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A electrode arrangement for the plasma-aided coating of a substrate with a layer, comprising:

at least a first and a second material component which produce a plasma discharge;

an anode arrangement which defines said first material component at an anode material

5 surface for evaporation; and

a cathode arrangement which defines said second material component at a cathode material surface;

wherein said cathode material surface is constituted by an evaporation-active part supporting the plasma discharge and an evaporation-inactive part not supporting the plasma
10 discharge.

2. The electrode arrangement in claim 1 including a motion-producing device for moving said evaporation-active part, and thereby moving said evaporation-inactive part over said cathode material surface in order to reduce deposits of material due to the first material component on said cathode material surface.

3. The electrode arrangement in claim 2 wherein said motion-producing device includes a baffle arrangement exposing said evaporation-active part at a baffle opening for the plasma discharge and shading off the evaporation-inactive part correspondingly from the plasma discharge and a drive moving the baffle opening in relation to said cathode material surface.

4. The electrode arrangement in claim 3 wherein said baffle opening is stationary in relation to said anode arrangement.

5. The electrode arrangement in claim 4 wherein said cathode material surface is in the form of a peripheral cylinder face of a cathode material body which is able to be turned by the drive about an axis of said cylinder face.

6. The electrode arrangement in claim 3 wherein said cathode material surface is in the form of a peripheral cylinder face of a cathode material body which is able to be turned by the drive about an axis of said cylinder face.
7. The electrode arrangement in claim 5 wherein said cathode material surface is in the form of an annular face of a cathode material body which is able to be turned by said drive about a central axis extending perpendicularly to the annular face.
8. The electrode arrangement in claim 4 wherein said cathode material surface is in the form of an annular face of a cathode material body which is able to be turned by said drive.
9. The electrode arrangement in claim 5 wherein said cathode material surface is in the form of a linearly extending face of a cathode material body able to be reciprocated by said drive in a direction of extension of the face.
10. The electrode arrangement in claim 4 wherein said cathode material surface is in the form of a linearly extending face of a cathode material body able to be reciprocated by said drive.
11. The electrode arrangement in claim 3 wherein said baffle opening fits like a hood at least partially around said cathode material surface for the formation of said evaporation-inactive part, which does not support the formation of the plasma discharge.
12. The electrode arrangement in claim 4 wherein said baffle opening fits like a hood at least partially around said cathode material surface for the formation of said evaporation-inactive part, which does not support the formation of the plasma discharge.
13. The electrode arrangement in claim 1 including a gas supply for supplying protective gas in front of the cathode material surface.
14. The electrode arrangement in claim 13 wherein said protective gas is supplied at the evaporation-active part of the cathode material surface.

15. The electrode arrangement in claim 3 including a gas supply for a protect gas is so introduced into an intermediate space between the baffle arrangement and the cathode material surface that the supplied protective gas escapes at least partially through the baffle opening toward the plasma discharge from the intermediate space between the cathode material surface and the baffle arrangement.

16. The electrode arrangement in claim 15 wherein the protective gas is supplied on the rear side, facing away from the baffle opening, of the cathode material surface.

17. The electrode arrangement in claim 1 wherein said first and second material components produce an arc discharge.

18. The electrode arrangement in claim 3 wherein said cathode material surface is in the form of a convex surface of a cathode material body so that said evaporation-active face is formed on an area directed toward said anode material surface.

19. The electrode arrangement in claim 18 wherein the orientation of said cathode material body may be changed by said drive in relation to the anode material surface.

20. The electrode arrangement in claim 1 including cleaning means for removing material deposits at said evaporation-inactive part of said cathode material surface.

21. The electrode arrangement in claim 20 wherein said cleaning means comprises a stripping means.

22. The electrode arrangement in claim 21 wherein said cleaning means comprises at least one of (i) a brush, (ii) a device abrasively treating the cathode material surface, and (iii) a device processing the cathode material surface in a chip-removing manner.

23. The electrode arrangement in claim 1 including a follow-u device which keeps a substantially constant clearance between said anode material surface and said evaporation-active part of said cathode material surface.

24. The electrode arrangement in claim 1 wherein said cathode arrangement comprises a plurality of evaporation-active parts arranged spatially apart of the cathode material surface.
25. The electrode arrangement in claim 1 wherein said anode arrangement includes a heatable crucible for liquefaction of said first material component.
26. The electrode arrangement in claim 1 wherein said first material component comprises silicon.
27. The electrode arrangement in claim 26 wherein said second material component comprises one of copper, zinc, brass and magnesium.
28. A method of using the electrode arrangement of claim 1 for the coating of packaging material. *Rest,*
29. A method of using the electrode arrangement in claim 1 for the coating of polyethylene terephthalate.
30. A method of using the electrode arrangement in claim 1 for coating a beverage bottle.
31. A method of using the electrode arrangement in claim 1 for coating a beverage bottle with a diffusion insulation material layer or a permeation insulation material layer.
32. A method of using the electrode arrangement in claim 1 for the coating of strip material.
33. A method of using the electrode arrangement in claim 1 for the coating of strip material in the form of a foil strip.